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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,437	10/27/2000	Vivek K. Goyal	7-16-1	6522

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09/24/2002

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EXAMINER

HARPER, VINCENT P

ART UNIT

PAPER NUMBER

2654

DATE MAILED: 09/24/2002

9

Please find below and/or attached an Office communication concerning this application or proceeding.

BL

Office Action Summary

Application No.

09/698,437

Applicant(s)

GOYAL ET AL.

Examiner

V. Paul Harper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-7, 10-18, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) 8, 9, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on 7/30/2002. These drawings are acceptable.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, 7, 10, 11, 12, 13, 15, 18, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming et al. ("Generalized Multiple Descriptive Vector Quantization," Data Compression Conference, sponsored by IEEE Computer Society, March, 1999), hereinafter referred to as Fleming, in view of Saleh et al. (U.S. Patent 5,048,057), hereinafter referred to as Saleh.

Regarding claims 1 and 12, Fleming describes a wireless system that uses multiple descriptions during data transmission (abstract, pg. 4, last paragraph), which reads on "a wireless system with a multiple description coder operative to generate a plurality of different descriptions of a given portion of the signal"; Fleming also describes how in a multiple descriptive system designed with two data increments the

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data increments are broken into packets, where each packet is time-stamped and independently sent (pg. 4, third paragraph, and pg. 5, second paragraph), which reads on "the different descriptions of the given portion of the signal being arranged into packets."

Fleming, however, does not specifically mention that "at least a first description of the given portion is placed in a first packet and a second description of the given portion is placed in a second packet," but an artisan at the time of the invention would have known that the packetized versions of the same portion of data would commonly be time-stamped, as indicated by Fleming, and then inherently sent sequentially with the first version first and the second version second.

In addition, Fleming does not specifically teach the use of a frequency hopping modulator; however, the examiner contends that the concept of a frequency hopping modulator used in a system exhibiting built-in diversity was well known in the art, as taught by Saleh.

In the same field of endeavor, Saleh describes a wireless local area network that uses a frequency hopping modulator connected to an encoder for channel coding (column 1, line 53, Figure 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming by specifically providing a frequency hopping modulator connected to an encoder, as taught by Saleh, for the purpose recovering lost information with a high probability (column 1, lines 53-56, also Figure 1). The resulting configuration reads on "a frequency hopping modulator having an input

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coupled to an output of the multiple description coder and operative to configure the packets for transmission."

Additionally, in Saleh's system, the signal points are rearranged for transmission in such a way that information is transmitted over a sequence of predefined "hopping" frequencies in a predefined order and each signal point from each codeword is transmitted on a respective different hopping frequency (column 1, lines 45-65), which reads on "a hopping rate of the modulator is configured based at least in part on a number of descriptions generated for each of a plurality of different portions of the signal."

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming, as taught by Saleh, by specifying a hopping frequency based on the number of descriptions such that lost information can be recovered with a high probability (column 1, lines 54-56).

Regarding claims 2 and 13, Fleming in view of Saleh disclose everything claimed, as applied above (see claim 1 and 12, respectively), in addition, Fleming discloses research that includes algorithms for the design of multiple description scalar quantizers for data transmission (pg. 6, first paragraph), which reads on "the multiple description coder comprises a multiple description coder configured to implement multiple description scalar quantization (MDSQ)."

Regarding claims 4 and 15, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively), in addition, Fleming discloses that the information to be transmitted is broken into small packets, each of

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which is time-stamped (pg. 4, paragraph 3), which reads on "each of the portions of the signal correspond to a designated segment of the signal having a particular time duration."

Regarding claims 7 and 18, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively); however, Fleming fails to specifically disclose that the frequency of the hopping modulator is configured such that each of the packets is transmitted using a different frequency. However, the examiner contends that such a use of hopping frequency was well known in the art, as taught by Saleh.

Saleh discloses a system in which information is communicated over a sequence of predefined "hopping" frequencies (column 1, lines 48-50) and a number of sequential codewords are transmitted on a single hopping frequency before transmission proceeds to the next hopping frequency (column 2, lines 3-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by configuring the frequency hopping modulator such that each of the packets is transmitted using a different frequency, as taught by Saleh, such that lost information can be recovered with a high probability (column 1, lines 55-57).

Regarding claims 10 and 21, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively). Fleming teaches that the information to be transmitted is broken up into a number of small packets (pg. 4, paragraph 3) and that for a two channel description of a signal there would be two data

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increments (pg. 5, paragraph 2). Fleming, however, does not teach the mixing of descriptions from current and previous portions of the signal. However, the examiner contends that such a mixing of data was well known in the art, as taught by Saleh.

Saleh teaches that information for codewords are made up from a number of signal points rearranged for transmission (column 1, lines 54-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by generating "two descriptions for each of a plurality of different portions of the signal, with a first one of the descriptions for a current one of the portions of the signal being placed in a current packet along with a second one of the descriptions for a previous portion of the signal," as taught by Saleh, so as to reduce the effects of data loss.

Regarding claims 11 and 22, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively). However, Fleming fails to specifically disclose that "the hopping rate of the frequency hopping modulator is selected such that a transmission delay of the system is not increased as a result of the transmission of the plurality of descriptions relative to a transmission delay of the system for single description transmission." However, the examiner contends that the relationship between transmission delay and hopping frequency was well known in the art, as taught by Saleh.

Saleh teaches that a number of codewords are transmitted on a single hopping frequency before transmission proceeds to the next hopping frequency since this

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reduces the rate at which the system needs to switch from one hopping frequency to another (column 2, line 2-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by adjusting the hopping frequency modulator so as to not introduce delay, as taught by Saleh, and hence maintain the same data transmission rate as in the case of the transmission of a single description.

4. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of Ingle et al ("DPCM System Design for Diversity Systems With Applications to Packetized Speech," IEEE Transactions on Speech and Audio Processing, Vol. 3, No. 1, Jan. 1995), hereinafter referred to as Ingle and further in view of well known prior art (MPEP 2144.03).

Regarding claims 3 and 14, Fleming in view of Saleh disclose everything claimed as applied above (see claims 1 and 12, respectively); however Fleming in view of Saleh do not specifically disclose a multiple descriptive coder that comprises a multiple description adaptive differential pulse code modulation (ADPCM) coder. However, the examiner contends that the concept of using a DPCM (and hence an ADPCM) as a multibit coder was well known in the art, as taught by Ingle.

In the same field of endeavor, Ingle teaches the use of a multi-bit differential pulse-code modulator (DPCM) as a multiple descriptive coder (pg 48, section II, 1st paragraph).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh by using a DPCM

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coder, as taught by Ingle, for the purpose of coding the speech in a diversity system to better withstand packet losses (pg 48, section II, 1st paragraph).

Ingle does not specifically teach the use of an ADPCM as a coder; however the examiner takes official notice of the fact that a ADPCM system is a specialized form of a DPCM system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh and Ingle to use an ADPCM coder to improve the quality of the quantization at lower data rates.

5. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of Vaishampayan ("Design of Multiple Description Scalar Quantizers," IEEE Transactions on Information Theory, Vol. 39, No. 3, May 1993).

Regarding claims 5 and 16, Fleming in view of Saleh disclose everything as claimed above (see claims 1 and 12, respectively); however, Fleming in view of Saleh do not specifically teach that the signal comprises a speech signal. However, the examiner contends that the concept of using multiple description source codes in applications such as speech was well known in the art, as taught by Vaishampayan.

In the same field of endeavor, Vaishampayan teaches use of multiple description scalar quantizers in applications such as speech over packet-switched networks (pg. 821, column 2, paragraph four).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh by specifically

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applying multiple description coding techniques to speech signals, as taught by Vaishampayan, where packet losses can result in the degradation in signal quality.

6. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of well known prior art (MPEP 2144.03).

Regarding claims 6 and 17, Fleming in view of Saleh disclose everything as claimed above (in claims 1 and 12, respectively), in addition, Fleming discloses the use of packet-based communication protocols in wireless systems (pg. 4, paragraph 3); however, Fleming fails to specifically disclose that the wireless communications system comprises a cordless telephone system. However, the examiner takes official notice of the fact that the use of wireless technology for a telephone system was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh such that the wireless communications system included a telephone system, so as to make conversations over a wireless telephone system more reliable.

Allowable Subject Matter

7. Claims 8, 9, 19, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 8 and 19, Saleh teaches that it would be advantageous to combine codewords to reduce the hopping rate (col. 2, lines 5-7); however, Saleh does

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not specifically teach that the hopping rate of the frequency hopping modulator is selected as twice a frequency hopping rate of the modulator used for transmission of a single description of the given portion of the signal.

Regarding claims 9 and 20, neither Fleming nor Saleh teach that a packet size for the first and second packets is selected as one-half a packet size used for transmission of a single description of the given portion of the signal.

Response to Arguments

8. Applicant's arguments regarding claims 1 and 12 filed on 7/30/02 have been fully considered but they are not persuasive.

9. Applicant further asserts on page 2:

The present invention as set forth in independent claims 1 and 12 is directed to a signal processing method and apparatus, respectively, in which a signal is encoded in a multiple description decoder, which generates a plurality of different descriptions of a given portion of the signal. These claims also include substantially the following limitations:

(i) the different descriptions of the given portion of the signal are arranged into packets such that at least a first description of the given portion is placed in a first packet and a second description of the given portion is placed in a second packet; and

(ii) the packets are transmitted using a frequency hopping modulator, wherein a hopping rate of the modulator is configured based at least in part on a number of descriptions generated for each of a plurality of different portions of the signal.

10. Applicant continues on page 4

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The Examiner in formulating the § 103 (a) rejection of independent claims 1 and 12 argues that the claimed invention is obvious even though at least limitation (ii) above is not explicitly disclosed by either Fleming or U.S. Patent No. 5,048,057 (hereinafter "Saleh").

Applicants submit that there is no motivation to combine Fleming and Saleh in the manner urged by the Examiner. For example, there is no mention in Fleming of a frequency hopping modulator or the desirability of using such a modulator for transmission of multiple descriptions in the manner claimed. Similarly, *there is no mention in Saleh regarding multiple descriptions or their use in conjunction with a frequency hopping modulator in the manner claimed* (Italics added). The Examiner has therefore failed to establish the first of the criteria specified in MPEP §706.02, that is, has failed to identify some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. The Examiner instead relies upon impermissible hindsight to reconstruct the present invention from unrelated references.

11. In response to Applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Moreover, Saleh indicates that the combination of frequency hopping with *some form of channel coding* has been proposed and relates to the (Saleh's) described invention (col. 1, lines 39-35). In addition, Saleh motivates this combination by suggesting it might be an effective counter to fading and interference (col. 1, 29-30). Since multiple description coding is a coding technique used to reduce information loss

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during transmission (Fleming, §1), the Examiner contends that the combination is both suggested and motivated by the prior art.

Applicant asserts on page 4:

Moreover, even if one were to assume, for purposes of argument, that the Fleming and Saleh references are combinable in the manner urged by the Examiner, the combination would fail to meet at least limitation (ii) above.

The Examiner argues that column 1, lines 45-65 of Saleh reads on limitation (ii) above, despite the fact that Saleh makes no mention of multiple descriptions and multiple descriptions are a requirement of the limitation. The cited portion of Saleh teaches nothing beyond conventional frequency-hopping modulation. There is no discussion or suggestion regarding limitation (ii) of the claimed invention, in which the *frequency hopping rate of the modulator is configured based on the number of descriptions generated in multiple description encoding* (Italics added). The combination proposed by the Examiner therefore fails to meet certain limitations of claims 1 and 12, and therefore fails to meet the third and final criterion specified in MPEP §706.02.

12. Saleh teaches the generation of a sequence of codewords with inherent redundancy such that if a codeword is lost the information can be recovered with a high probability (col. 1, lines 60-66). Saleh further teaches that a number of codewords are transmitted on a single hopping frequency before transmission proceeds to the next hopping frequency to reduce the rate at which the system needs to switch from one hopping frequency to another (col. 1, line 67 through col. 2, line 7) which implies the hopping rate is configured based on the number of codewords. The Examiner contends that in Fleming in view of Saleh, Saleh's codewords correspond to the multiple description encoding; hence, "the frequency hopping rate of the modulator

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is configured based on the number of descriptions generated in multiple description encoding."

To summarize, independent claims 1 and 12 in limitation (ii) above require that the hopping rate of the modulator be configured based on the number of descriptions generated in a multiple description encoding process. The Examiner has combined a pair of references, one a multiple description reference with no mention of frequency hopping and the other a frequency hopping reference with no mention of multiple descriptions, in an attempt to recreate the present invention based on the benefit of hindsight and without identifying a cogent motivation for the combination. Moreover, even if one were to assume for purposes of argument that the references are combinable, the combination fails to meet at least limitation (ii) above.

13. As argued above in sections 11 and 12, and the rejections of claims 1 and 12 are upheld.

14. Regarding claims 10 and 21, it is the Examiner's position that the rejections of these claims do rely on specific teachings from the art as cited above in section 3.

Citation of Pertinent Art

15. The following prior art made of record but not relied upon is considered pertinent to the applicant's disclosure:

- a) Gaskill (U.S. Patent No. 5,629,940) is cited to show a method for transmitting a long message over several time slots in a time division multiplex system.

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- b) Lee et al. (U.S. Patent No. 5,812,522) is cited to show a time domain multiplex system where frame size and hopping rate are functionally related.
- c) Mabuchi (U.S. Patent No. 5,887,023) is cited to show a frequency hopping spread spectrum system.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any response to this office action should be mailed to:

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Washington, D.C. 20231

or faxed to:

(703) 872-9314

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Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive
Arlington, VA.
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold, can be reached on (703) 305-4379. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.

VPH/vph
September 20, 2002

Marsha D Banks-Harold
MARSHA D. BANKS-HAROLD
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